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religion, and no man cared less than he, if the service were only rendered, whether it was in his own name or in that of others.

As to College honors, Dr. Hill received the degree of Doctor of Divinity from Harvard University in 1860, and that of Doctor of Laws from Yale College in 1863. He was a member of the American Philosophical Society, of the Massachusetts Historical Society, and of many other associations of like character.

The following is a partial list of Dr. Hill's publications in other than pamphlet form :—

Elementary Treatise on Arithmetic, 1845.

Geometry and Faith, 1849. 2d edition, revised and enlarged, 1874.

3d edition, greatly enlarged, 1882.

First Lessons in Geometry, 1855.

Jesus the Interpreter of Nature, and other Sermons, 1860.

Second Book in Geometry, 1863.

Natural Sources of Theology, reprinted from the *Bibliotheca Sacra*, 1874.

Arithmetic (Wentworth and Hill), 1883.

In the Woods and Elsewhere, 1888.

JOSEPH LEIDY.

JOSEPH LEIDY, a member of this Academy since May 30, 1848, died, after a brief illness, at his residence in Philadelphia, Pa., on April 30, 1891. His ancestors were of French-German descent, and came to this country as missionaries. His father, Philip Leidy, was born in Montgomery Co., Pa., in 1791, and married Catherine Melick.

Joseph Leidy was the third child by this marriage, and was born in Philadelphia, September 9, 1823. His mother died when he was a year and a half old; later his father married Christiana Melick, a sister of his first wife. She proved to be an admirable mother to Joseph, and to her watchful care and direction is due in great measure his choice of life work. His early education was obtained in private schools, and even during this period he manifested a marked inclination toward the study of natural history, being particularly interested in plants and minerals. After hearing a lecture on these subjects, given by an itinerant lecturer in the schoolhouse, young Leidy procured text-books, and began the systematic study of botany and mineralogy. From an early age he showed great skill in drawing. This power became so marked that at the age of sixteen his father removed him from school with the intention of having him become an artist. At this period he spent much of his time in a wholesale drug-store near his home; here

he made such good use of the opportunity for studying the nature of various drugs, and in compounding medicines, that the proprietor recommended the boy as being competent to take charge temporarily of the retail drug-store of a customer.

This success led him to consider seriously the advisability of becoming an apothecary. All this time he had continued his natural history studies, and by the dissection of a few cats, chickens, etc., he developed such an interest in comparative anatomy that his step-mother decided that Joseph should become neither an artist nor a druggist, but a physician. Having decided upon the study of medicine, he gave his first year to the study of practical anatomy, and under the preceptorship of Doctors Paul B. Goddard and James McClintock took three full courses of medical lectures at the University of Pennsylvania, receiving in the spring of 1844 the degree of Doctor of Medicine, his thesis being an admirable essay on "The Comparative Anatomy of the Eye of Vertebrated Animals." He now entered upon the active practice of medicine, and at the same time was appointed Assistant to the Chair of Chemistry in the University. He also assisted Dr. Goddard, the Demonstrator of Anatomy.

At the end of two years he gave up the practice of medicine in order that he might devote himself entirely to study and teaching. His skill in anatomy was so great that he was appointed Prosector to the Chair of Anatomy by Professor Horner. In 1846 he was elected Demonstrator of Anatomy in the Franklin Medical College, which position he held for one year and then resigned to return to the University, where he was again associated with Professor Horner. He also gave private courses in anatomy. In the spring of 1848 he accompanied Dr. Horner to Europe, in the fall gave a course of lectures on Histology, and in the following spring lectured on Physiology at the Medical Institute. This constant application affected his health so that he was obliged to abandon all work for some months. In 1850 he went abroad with Dr. George B. Wood to make a collection of models, drawings, etc., with which to illustrate Dr. Wood's course of lectures on Medicine. This trip was of very great value to Dr. Leidy, as it enabled him to visit all the great museums of Europe, and to make the acquaintance of such distinguished anatomists and physiologists as Owen, Majendie, Hyrtl, Johannes Müller, and others. He returned from this trip with renewed health, and in 1851 resumed his anatomical work at the University.

During this year he was elected a member of the College of Physicians and appointed Pathologist to St. Joseph's Hospital. In the

winter of 1852 Professor Horner through ill health was unable to continue his lectures on anatomy, and at his request Dr. Leidy was appointed as his substitute. After the death of Dr. Horner, he was, in May, 1858, appointed Professor of Anatomy, which position he held until his death.

During the ten years preceding his appointment to the Chair of Anatomy, in addition to his regular duties, Dr. Leidy found time to continue his scientific studies. In 1844, the year of his graduation, he contributed to Amos Binney's monograph of the Mollusca an admirable introductory chapter on the "Special Anatomy of the Terrestrial Mollusks of the United States," together with sixteen beautifully executed plates illustrating the anatomy of thirty-eight species of Mollusca. In 1845 he was elected a member of the Boston Society of Natural History, and of the Philadelphia Academy of Natural Sciences. With the latter institution he was constantly associated during the rest of his life, being successively Librarian, a Curator, and from 1847 chairman of the Board of Curators. With his natural modesty, he many times refused the office of President, but finally in 1881 accepted it, and remained President of the Academy to the end of his life.

The Proceedings of the Academy furnish a brilliant memorial of his great attainments in various branches of natural science, as they contain several hundred valuable contributions to zoölogy, paleontology, comparative, human, and microscopic anatomy, botany, and mineralogy. While he never regarded himself as an authority, and published but little upon mineralogy and botany, his knowledge of these subjects was that of a specialist. This was well shown by the frequent verbal communications which he made as Curator in calling the attention of the Academy to additions to the mineralogical cabinet; his knowledge of gems and their values was also very extensive. The very fine and valuable mineralogical collection made by him has recently been purchased by the government, and will be placed in the National Museum in Washington.

His familiarity with plants was also frequently noted at the meetings of the Academy and elsewhere. The herbarium which he gave the Biological Department of the University of Pennsylvania contains over 1,500 species which were collected and determined by himself.

In zoölogy he gave especial attention to invertebrate forms; and while paying particular attention to parasites and Protozoa, he made valuable contributions to our knowledge of many other groups. As early as 1846 he observed minute specks in some pork that had been cooked, which, when examined with a microscope, were found to be a

species of *Trichina*. In his communication on this discovery he stated that this species was apparently the same as that found by Owen and himself in man. The famous zoölogist Leuckart, who afterward worked out the life history of *Trichina spiralis*, acknowledged his indebtedness to this observation of Dr. Leidy. In 1853 appeared the "Fauna and Flora within Living Animals," a beautifully illustrated and valuable work, which showed very clearly the wide range of animal and vegetable parasites which are to be found in the alimentary canals of small animals, as beetles, centipedes, cockroaches, etc. This paper is also interesting as having expressed ideas closely resembling in many respects those advanced a few years later by Darwin in his "Origin of Species."

Dr. Leidy's contributions to helminthology were numerous, and of such merit as to render him the highest authority on this subject in this country, and the peer of such men as Leuckart, Cobbald, and Diesing. His papers upon various insects and their life histories gave evidence of his familiarity with entomology. In 1848 he made the discovery of the presence of eyes in a species of *Balanus*, which led Darwin to look for them in other members of this group.

Dr. Leidy was particularly interested in the very lowest forms of animal life. In addition to many smaller papers, he gathered together in the magnificent monograph, "Fresh Water Rhizopods of North America," the results of many years' study. The numerous plates illustrating this volume are splendid examples of his marvellous artistic skill. Among the first persons in this country to use the microscope, he early established his ability as a histologist by his valuable paper, "Researches into the Comparative Structure of the Liver" (1848). The views advanced in this paper, though not generally accepted at the time, have since been largely confirmed by embryological research.

In 1861, he published "An Elementary Text-book on Human Anatomy," in which the noteworthy attempt was made to substitute an English terminology with foot-note references for the cumbersome and perplexing anatomical nomenclature in common use. This was quite successful, and was carried to still greater perfection in the second edition of this book, which was finished a short time before his death. This anatomy is unexcelled by any in the language for accuracy of detail and clearness of expression. Dr. Leidy's other papers upon vertebrate anatomy exhibit the careful work and clear judgment so characteristic of all that he did, and the many new facts presented by him have been almost always confirmed by later investigators. No

one was more ready than himself to acknowledge and correct an error when found.

There remains still another field of scientific research in which Dr. Leidy achieved a world-wide reputation, namely, paleontology. His first paper on this subject appeared in 1847, "The Fossil Horse of America." Although he was almost the first person in this country to take up the subject of vertebrate paleontology, and had at first very meagre opportunities for the study of the comparative osteology of many recent forms, he produced in the next few years a series of brilliant papers, which entitle him to be considered as the equal of any paleontologist produced by this country or Europe.

The following are among the more prominent of his many contributions to this subject: "Ancient Fauna of Nebraska," 1853; "Memoir of the Extinct Sloth Tribe of North America," 1855; "Cretaceous Reptiles of the United States," 1865; "Extinct Mammalian Fauna of Dakota and Nebraska, together with a Synopsis of the Mammalian Remains of North America," 1869; "Contributions to the Extinct Vertebrate Fauna of the Western Territories," 1873; "Description of Vertebrate Remains from the Phosphate Beds of South Carolina," 1877.

The interest aroused by these wonderful discoveries led others to enter this field of investigation. Great rivalry and many acrimonious disputes regarding priority and nomenclature arose, so that, rather than become entangled in controversy, Dr. Leidy gave up this work in which he had achieved such success, and devoted himself to other fields of scientific work. He however contributed from time to time small paleontological papers, the last appearing in May, 1890.

Dr. Leidy acted as surgeon to the Satterlee Military Hospital during the war, and the results of the many interesting autopsies made by him are recorded in the "Medical and Surgical History of the War."

He was elected a member of the National Academy of Science, in 1863, at the time of its organization. In 1871 he was appointed Professor of Natural History in Swarthmore College; and in 1884, upon the establishment of the Biological Department of the University of Pennsylvania, he was appointed Professor of Zoölogy and Comparative Anatomy. In 1885 he was elected President of the Wagner Free Institute of Science in Philadelphia; and in 1889, at the time of its organization, President of the Association of American Anatomists.

Many honors, both at home and abroad, were conferred upon this distinguished naturalist. In 1886 Harvard University conferred upon

him the degree of Doctor of Laws. The Boston Society of Natural History awarded to him, in 1879, the Walker grand prize of \$500, which in this instance was raised to \$1,000 as a special recognition of his contributions to science. In 1879 he received a prize from the Royal Microscopical Society. The Geological Society of London awarded to him, in 1884, the Sir Charles Lyell medal for his paleontological researches; and in 1888 he received from the Paris Academy of Sciences the Cuvier medal for his work in biology. In the period from 1845 to 1887 he was elected honorary member by over forty of the learned societies of Europe and this country.

It is impossible in this brief notice to do more than indicate in the most general manner the life work of this great man, which covers almost a half-century. In this period his contributions to natural history number nearly one thousand, ranging from short papers to large illustrated volumes, which probably contain fewer errors of fact and interpretation than those of any other writer on so many and such varied subjects. His personal character was in perfect accord with his wonderful mental attainments. He was remarkable for an entire absence of self-assertion or conceit. Wholly unselfish, his amiability and charming simplicity of manner rendered him a delightful companion, always approachable and ready to aid a student by advice or explanation. In the lecture-room his clear and concise descriptions formed word pictures rivalling in distinctness his admirable blackboard illustrations. He was as incapable of deceit as he was modest, and submitted to imposition rather than enter into controversy. His long life was devoted to science for the advancement of knowledge, and without thought of gain or personal glory.

Notwithstanding failing health during the last few months, Dr. Leidy still continued his active work; and thus, as he desired, with his shoulder to the wheel, one of America's greatest naturalists passed away.

NOAH PORTER.

NOAH PORTER, son of Rev. Noah Porter, D. D. (Yale College, 1803), was born in Farmington, Conn., on the 14th of December, 1811. His father was pastor of the Congregational Church in that town for nearly sixty years, and had high reputation as a learned, wise, faithful, and efficient minister. The son graduated at Yale College in 1831, and immediately took charge of the Hopkins Grammar School in New Haven, — a position which at the end of two years he